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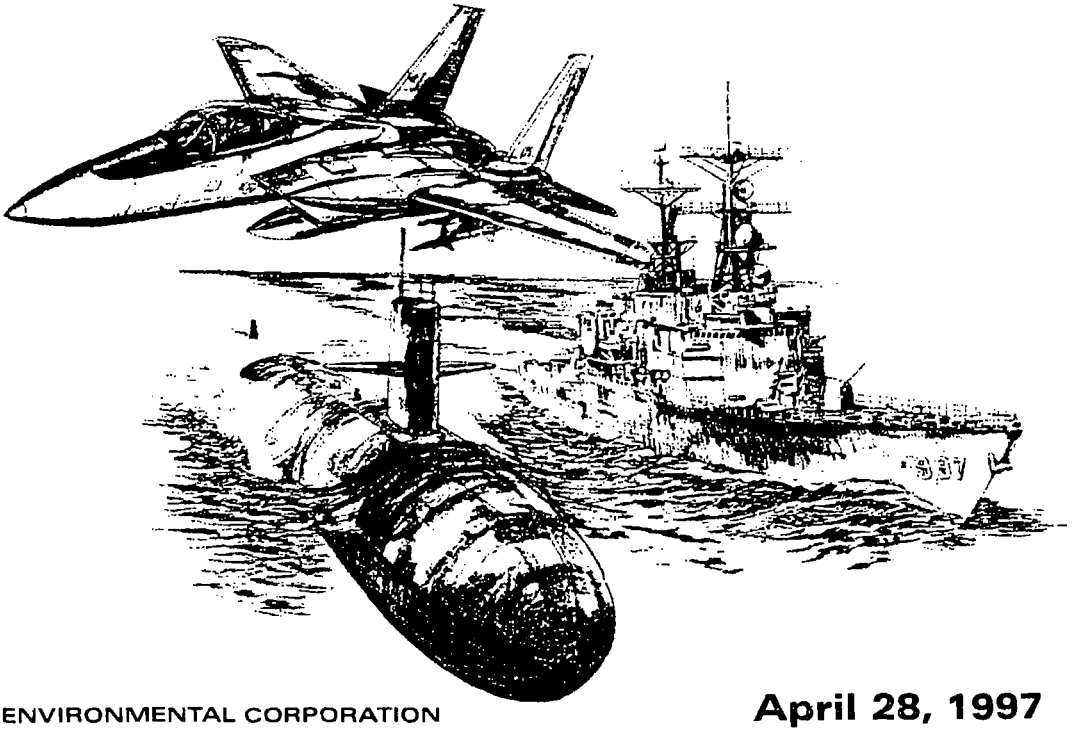
Contract No. N44255-95-D-6030

Environmental Remedial Action Contract for Sites in Washington, Oregon, Idaho, Montana, and Alaska

Site Visit Report

Site Visit and Response Action Alternative

Ames Landfill Spill
RACII/Delivery Order No. 0023



FOSTER WHEELER ENVIRONMENTAL CORPORATION

April 28, 1997

CONTRACT NO. N44255-95-D-6030
RAC II, DELIVERY ORDER NO. 0023, TASK 10

DRAFT
SITE VISIT REPORT

SITE VISIT AND CONSTRUCTIBILITY REVIEW
AMES LANDFILL
KITSAP COUNTY, WASHINGTON

FOSTER WHEELER ENVIRONMENTAL CORPORATION

APRIL 28, 1997

Prepared by: _____
Andy Bolt
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1. INTRODUCTION

Engineering Field Activity, Northwest (EFA) sent a Technical Direction Letter, dated April 4, 1997, directing Foster Wheeler Environmental to visit the Ames Landfill and recommend appropriate response actions. The visit was held the morning of April 4, and included:

Chris Drury - EFA	LT Nunnes -EFA	Andy Bolt - FWENC
Pat Donnelly -EFA	Eric Hanger -EFA	Bernie Wong -FWENC
Jim Reeves -EFA		

The group departed EFA Northwest at 10:00 a.m.

2. SITE VISIT

The Ames Landfill is located approximately 1.5 miles west of Gorst along the southeast side of State Highway 3. The 10- to 15-acre former landfill is currently the site of Airport Auto-Wrecking. Based on observations made from the highway, the auto-wrecking yard has vehicles occupying the entire landfill site. Figure 1 shows the location of the site, and Figure 2 is a copy of a landfill drawing, dated April 1968, found in the Health Department's file on the Ames Landfill. The landfill was created by filling in the small river valley created by Gorst Creek. This valley is approximately 250 to 300 feet wide at the top, approximately 75 to 100 feet deep, and has the classic V-shape seen in young rivers and streams. Based on the landfill drawings provided by the Health Department, a 36-inch diameter by 300-foot long culvert was placed under the landfill to carry the flow of Gorst Creek from the upstream edge of the landfill to a downstream discharge point. The downstream discharge point is not visible, and has apparently been covered by mud and debris slides. This discharge point is located at the toe of a steep slope that is eroding away. From this point, Gorst Creek continues to flow for approximately 750 feet before entering a 36-inch culvert that carries the creek through the fill area created by the construction of State Highway 3.

The Ames Landfill is located on private property. The Washington State Department of Transportation (WSDOT) has a right-of-way that borders the landfill. Prior to visiting the

site, Chris Drury of EFA received permission from WSDOT to enter their right-of-way to inspect the slide area of Ames Landfill.

The Ames Landfill slide site was entered from State Highway 3 at the northeast end of the southern guardrail above Gorst Creek. The approximately 750 feet of Gorst Creek between the highway culvert and the toe of the landfill slope was littered with landfill debris. While walking from the highway towards the landfill, the observed debris included a 500-gallon tank, an old tire, an empty blood recipient set, various cans, a second 500-gallon tank, a washing machine, a syringe, and miscellaneous landfill debris scattered throughout the area. Much of the debris located near the highway culvert was partially buried in sand and silt carried by the creek, while debris closer to the landfill appeared to be laying on the surface. The conditions at the site indicate that the debris has been moving downstream from the landfill for awhile. Photographs of the debris located between the highway culvert and the toe of the slope are included in Appendix A.

While standing at the toe of the slope and looking up towards the top of the landfill, it was evident that the landfill has been eroding for some time. Several rills and washes exist near the toe of the slope. One of these rills was stained with a reddish-brown color. The entire face of the slope was littered with landfill debris including automobiles and automotive parts, 5-gallon metal containers, various types of scrap metal (origin unknown), and various cans and containers. There was also evidence of a slide that uprooted several trees in the center of the slope area. The fallen trees did not exhibit bent trunks or stress symptoms and the root balls on the trees still contained a large mass of soil, implying very short-term, sudden slope failure as opposed to long-term landslide movement. The top 40 to 60 feet of the landfill slope is a sheer wall which has been undercut, possibly as a result of the recent slide. The face of the slope appeared to be dry from top to bottom and no seeps were observed during the site walk, indicating the absence of a groundwater table or water lenses (seeps) within the landfill mass. In its current condition, the slope will continue to either erode or slide with time, exposing more landfill debris. The continued undercutting of the 40- to 60-foot sheer landfill wall could cause additional failures. The sheer wall at the top of the slope provided a rather clean cross-sectional view of the landfill cover. Based on observations of this wall, there is approximately 1 to 2 feet of soil cover over the landfill debris. Photographs of the landfill slope are included in Appendix A.

At the time of observations in the field, Gorst Creek appeared to be recharging the groundwater table. This is based on the lack of seeps or springs observed along the channel edges. This lack of seeps may also indicate that Gorst Creek is an intermittent stream, only flowing during the rainy season.

3. CONSIDERATIONS ASSOCIATED WITH THE RECENT SLIDE

Based on information discussed during the site visit, the recent slide was discovered by WSDOT during routine sampling of Gorst Creek. The sample team observed garbage and debris along the creek, and walked upstream to try to find the source. They continued upstream until they discovered the source was debris coming from the exposed face of the former Ames Landfill located over Gorst Creek. The results of their water sample analysis are unknown at this time.

Because the culvert that diverts Gorst Creek under State Highway 3 is located downstream of the slide area, WSDOT is concerned that the debris will plug their culvert. If the culvert becomes plugged, water will begin to back up behind the plug, turning the highway embankment into a dam, thus saturating and placing a hydraulic load on the road embankment. This would be detrimental to the highway. Seeps would likely occur as water travels through the embankment. These seeps would likely cause erosion and eventual failure of the highway embankment. If the valley behind this newly created dam were to fill with water, flow over the road would be a hazard to vehicles and would wash out the downstream highway embankment. WSDOT expressed these concerns in a meeting attended by EFA on Monday, March 31, 1997.

4. REGULATORY FRAMEWORK

The following is a brief summary of the regulatory approaches that are typical of sites such as the Ames landfill:

4.1 MTCA

Typically, Ecology may begin evaluating the site under the Model Toxics Control Act (MTCA). After discovery and reporting of a site, Ecology may then perform an initial

investigation followed by a Site Hazard Assessment. Based on the hazard ranking determined during the Site Hazard Assessment, the site may be added to the Hazardous Sites List. If added to the list, Ecology would oversee the Remedial Investigation and Feasibility Study (RI/FS) of the site. This is a lengthy process that may eventually lead to a remedial action being performed at the site.

To immediately address environmental concerns at the site, an interim action may be performed concurrently with the RI/FS process. Interim actions are performed to provide a short-term solution to an immediate concern. In the case of the Ames Landfill, an example of an Interim Action would be to stabilize the slope of the landfill immediately while the long-term solution is determined. The Interim Action must be consistent with the long-term solution or must not foreclose reasonable alternatives for the long-term solution.

Another possibility under MTCA is to perform an Independent Remedial Action. Independent Remedial Actions are typically performed by the Potentially Liable Party (PLP) to meet the remedial action objectives of a site independent of Ecology oversight. An Independent Remedial Action Report is prepared and submitted to Ecology once the remedial action is complete. Ecology will review the report and determine whether or not additional actions are required.

Throughout the MTCA process, Ecology would be the lead regulatory agency.

4.2 CERCLA

The U.S. Environmental Protection Agency (EPA) may have concerns about the site hazards and elect to oversee the site under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Often referred to as Superfund, the EPA's role under the CERCLA process is very similar to Ecology's role under MTCA. The site would be evaluated and a hazard ranking would be given to the site based on the relative degree of risk to human health and the environment. Based on the score, the site may be added to the National Priorities List (NPL) and the RI/FS process, along with any required remedial action, would begin. Because this is a landfill that may have apparent threats to the environment, the EPA will assume control of the site and oversee any investigations and remediation.

Under CERCLA, a Removal Action may be used by a Potentially Responsible Party (PRP) to provide a short-term solution to immediate threats at the site. Removal Actions under

CERCLA can either be time-critical or non-time-critical, depending on the urgency. Time-critical removal actions typically focus on getting the field work performed, and tend to have a reduced administrative requirement. Removal Actions must be consistent with the National Oil and Hazardous Substances Pollution Contingency Plan.

Throughout any action taken under CERCLA, the EPA would be the lead regulatory agency overseeing site activities.

5. INTERIM/REMOVAL ACTION ALTERNATIVES

The unstable slope, possible public exposure to landfill debris, and the concern that the State Highway 3 culvert may get plugged are environmental concerns that the regulators may want to address immediately. To correct any one or all of these concerns, an Interim Action or Removal Action may be selected. Possible removal actions include slope stabilization, monitoring exposure to contaminants, installing an engineered wall, or extending the existing culvert.

5.1 SLOPE STABILIZATION

A solution that addresses both road stability and environmental concerns is to create a stable slope in the current slide area. This could be achieved by two possible methods. The first method is to cut back the existing landfill slope to a stable angle of repose. This would require excavating into the existing landfill, placing the debris back into the level portion of the landfill, and providing soil cover and erosion control measures over the newly created slope, as well as the relocated landfill material. Approximately 30,000 cubic yards of material would need to be excavated and relocated. Approximately 3,000 cubic yards of imported soil cover would then be placed over the newly exposed slope and landfill surface. The newly created slope would be stabilized using erosion matting and planted with a vigorously growing, deep rooting vegetation. Excavating into any landfill poses several concerns, including personnel and public exposure, release of new contaminants, and discovery of debris that may not be allowed to go back into the landfill (asbestos containing materials, PCBs, hazardous waste, state dangerous waste, etc.). The excavation could allow for the opportunity to segregate recyclables, such as metal debris, which could have both a salvage value and reduce the overall volume of debris. The existing culvert under the landfill would require an extension so it protrudes beyond the new slope. Alternatively, the

culvert could be connected to the outlet under the road as discussed in Section 5.4 for an additional $180,000 to $250,000. This solution would address both the road stability concern and prevent further release of landfill debris into Gorst Creek. This solution only addresses the area of the unstable slope, and does not address the landfill as a whole. The cost to cut the existing slope back to a stable slope is approximately $1,750,000 to $2,000,000.

The second method of creating a stable slope is to leave the existing landfill slope alone, and using import material, create a stable slope by filling in the Gorst Creek valley. If a 3:1 (H:V) slope is used, approximately 64,000 cubic yards of import material is required. This slope could be increased, which would reduce the required amount of fill, by selecting proper fill material, incorporating reinforcement into the slope, or by using matting to stabilize the slope. This method would result in an extension of the current landfill boundary towards State Highway 3. An evaluation of the property lines would be required, since the new slope created by filling in the valley may extend into the WSDOT right-of-way. The concerns associated with excavating into the landfill are greatly reduced by this technique. Extending the culvert from the toe of the existing landfill boundary to the State Highway 3 culvert would be incorporated as part of this solution. This solution only addresses the area of the unstable slope, and does not address the landfill as a whole. The cost to extend the existing slope out to a stable slope and extend the culvert is approximately $1,250,000 to $1,500,000.

5.2 MONITOR EXPOSURE TO CONTAMINANTS

Although the landfill has been closed for approximately 25 years, the potential for new contamination being released from the landfill as a result of the recent and future slide activity is possible. A long-term monitoring program may adequately address the possible environmental concerns. A monitoring program would typically include the periodic sampling and analysis of surface water, groundwater, and air from the site. Upstream and downstream samples from Gorst Creek would represent the surface water samples. To sample groundwater, monitor wells located both up- and downgradient of the landfill would be installed. Periodic air quality samples from around the landfill may include the use of such instruments as a photionization detector (to detect volatiles) or a toxic gas indicator (to detect methane). Air monitoring may even be as simple as monitoring odor complaints from neighbors. Based on the April 4, 1997 site visit, none of the seven visitors detected an

odor coming from the landfill. Complete installation of 10 monitor wells would cost approximately $40,000, with an annual sampling and analysis cost of approximately $30,000 for the wells and $5,000 for upstream and downstream sampling of Gorst Creek, for a total annual cost of $35,000.

5.3 ENGINEERED WALL

Since WSDOT is concerned about debris plugging up the culvert that runs under State Highway 3, the installation of a wall between the toe of the slope and the culvert may be required. An engineered wall made of rock, timbers, ecology blocks, concrete, or other means and combinations would prevent slide debris from blocking the culvert. These types of walls are commonly used at the base of slide areas along highways, particularly over the mountain passes, to prevent slides from running out onto the road. The landfill would continue to slide in this area, until an equilibrium state is reached. The approximate size of the wall would be 150 feet long by 30 feet tall by 15 feet thick (being thicker at the toe). This solution would not address environmental concerns related to the exposed landfill debris or the downstream transport of any contaminants by Gorst Creek. The cost of installing such a wall would be approximately $400,000 to $500,000.

5.4 CULVERT EXTENSION

Another solution to prevent road embankment erosion would be to extend the culvert that carries Gorst Creek under the existing landfill. The culvert could be extended from the toe of the landfill slope and tie into the existing culvert under State Highway 3. This would require excavating debris at the toe of the slope to locate the culvert outlet. Prior to any excavation to locate the culvert, the hillside would require stabilization to prevent additional sliding. Elevations of the existing culverts would need to be matched and the existing section of Gorst Creek filled with a pipe bedding material so the two culverts could be connected. This solution would not address environmental concerns related to the exposed landfill debris. The cost to extend the culvert would be approximately $150,000 to $250,000.

6. REMEDIAL ACTION ALTERNATIVES

A remedial action may be selected to address the entire site if all threats to human health and the environmental are not addressed in an Interim/Removal Action. The selected remedial action is likely to be more comprehensive than the Interim/Removal Actions described above. Possible Remedial Actions may include no action, installation of a landfill cap, or excavation and removal of the landfill.

6.1 NO ACTION

The first possible remedial action would be that no action is required. The no action alternative would be selected only if the Interim/Removal Action adequately addressed threats to human health or the environment.

6.2 LANDFILL CAP

One alternative that addresses the landfill as a whole is to install a landfill cap in accordance with the Washington Administrative Code (WAC) 173-304 "Minimum Functional Standards for Solid Waste Handling" standard, or the more stringent WAC 173-351 "Criteria for Municipal Solid Waste Landfill" standard. These landfill caps are similar to the caps installed at Port Hadlock (WAC 173-304) and NAS Whidbey (WAC 173-351). A typical cross section of a WAC 173-304 cap would likely include grading fill to provide for site surface drainage; a geomembrane gas collection layer; an impermeable HDPE geomembrane or a geosynthetic clay liner; a geocomposite drainage layer; soil cover; and a final layer with topsoil and surface vegetation. A cap over the entire site would require relocating the current business (Airport Auto-Wrecking) that operates on the site. The relocation of the auto-wrecking facility may reveal soil contamination depending on past business practices. The WAC 173-304 standard states that side slopes may not exceed 3:1 (H:V), so the current slide area in Gorst Creek would be corrected. The standard also requires long-term maintenance and monitoring of the site. It is unlikely the site could be reused by Airport Auto-Wrecking, unless special provisions for the surface cover and expected loadings are evaluated. This could add additional cost to the landfill cap. Another cost concern would be the amount of consolidation a cap will cause within the landfill itself. Post-construction consolidation will stretch the liner, impacting the long-term liner stability and maintenance costs. A test fill program and subsurface investigations may be required to

address this concern. The cost to install a WAC 173-304 type of cap over the entire landfill is approximately $4,000,000 to $5,000,000, excluding the cost of a test fill program. A test fill program could delay the landfill cap construction and cost approximately $200,000. Installation of a WAC 173-351 cap would increase the cost by approximately $200,000 to $300,000.

It is important to note that any Removal Action to stabilize the failed slope may require rework to accommodate a landfill cap. If the slope is stabilized, it will be important to consider the interface with a future capped surface during the slope stabilization design and the limits of H:V slopes allowed in WAC 173.

6.3 GROUNDWATER REMEDIATION

If the groundwater is determined to be contaminated as a result of the landfill, groundwater remediation may be required. A typical groundwater remediation system would consist of extraction wells located downgradient from the contamination source, a treatment system, and a groundwater recharge system. Depending on the contaminants, the treatment system may utilize air stripping, carbon adsorption, ion exchange, and filtration to remove the contaminants. The treated groundwater is then re-injected or allowed to percolate into the groundwater table. Installation costs range from $350,000 to $500,000 and annual operating costs range from $40,000 to $100,000.

6.4 EXCAVATION AND REMOVAL

The most extreme alternative would be to excavate and remove the entire landfill, or possibly the portion of the landfill above Gorst Creek. This would be the most expensive alternative, with costs approaching $10,000,000+, depending on the extent of debris removal. It would be to the PLP/PRP's advantage to avoid this remedial action.

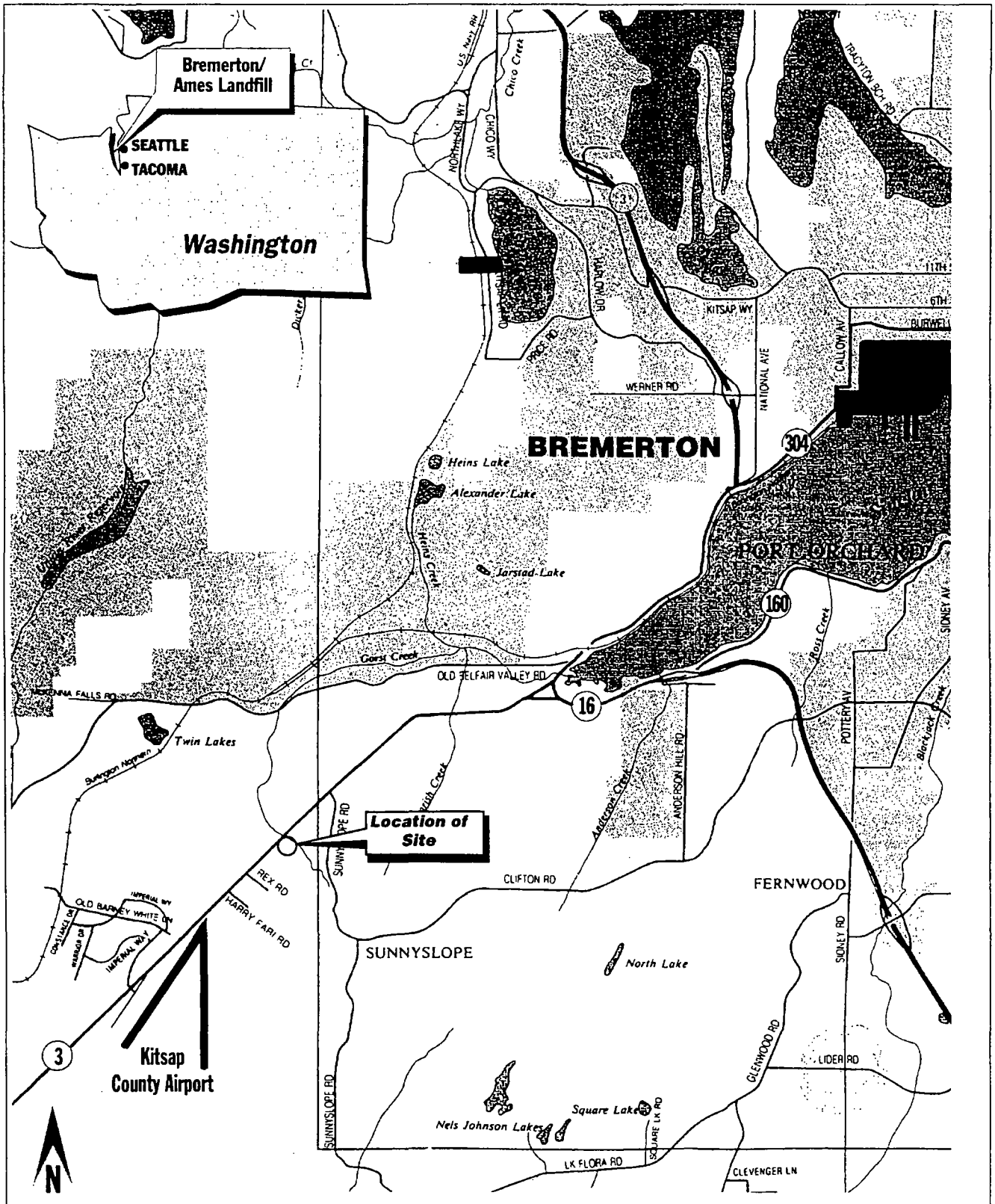

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Figure 1

Ames Landfill Site Location Map

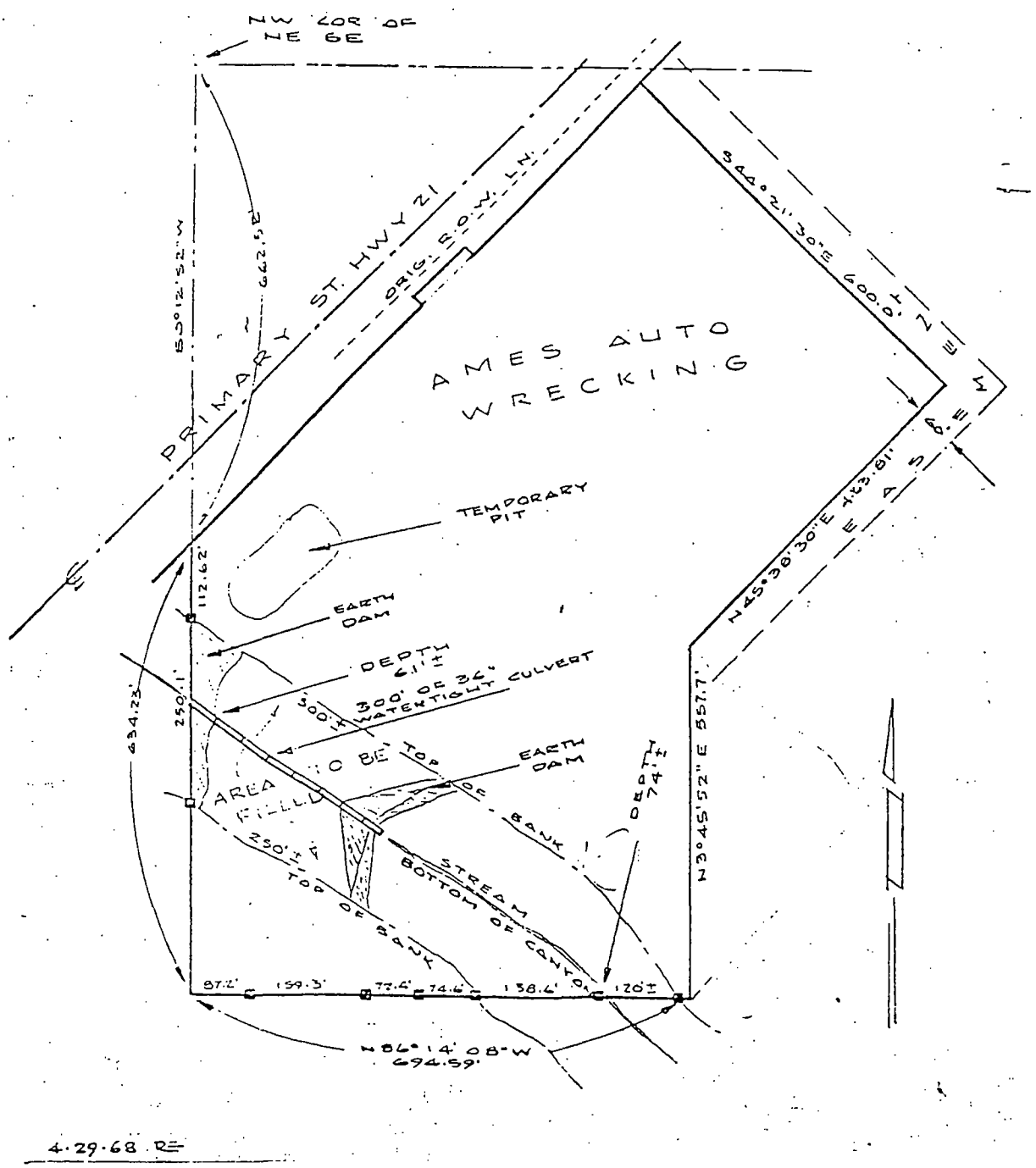

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Figure 2

Kitsap County Health Department Drawing of Ames Landfill

APPENDIX A

SITE VISIT PHOTOS

2. Landfill debris along Gorst Creek.

1. 500-gallon tank near State Highway 3 culvert.

4. Debris located approximately midway between State Highway 3 and the toe of the slope.

3. More debris along creek.

6. Near the toe of the slope.

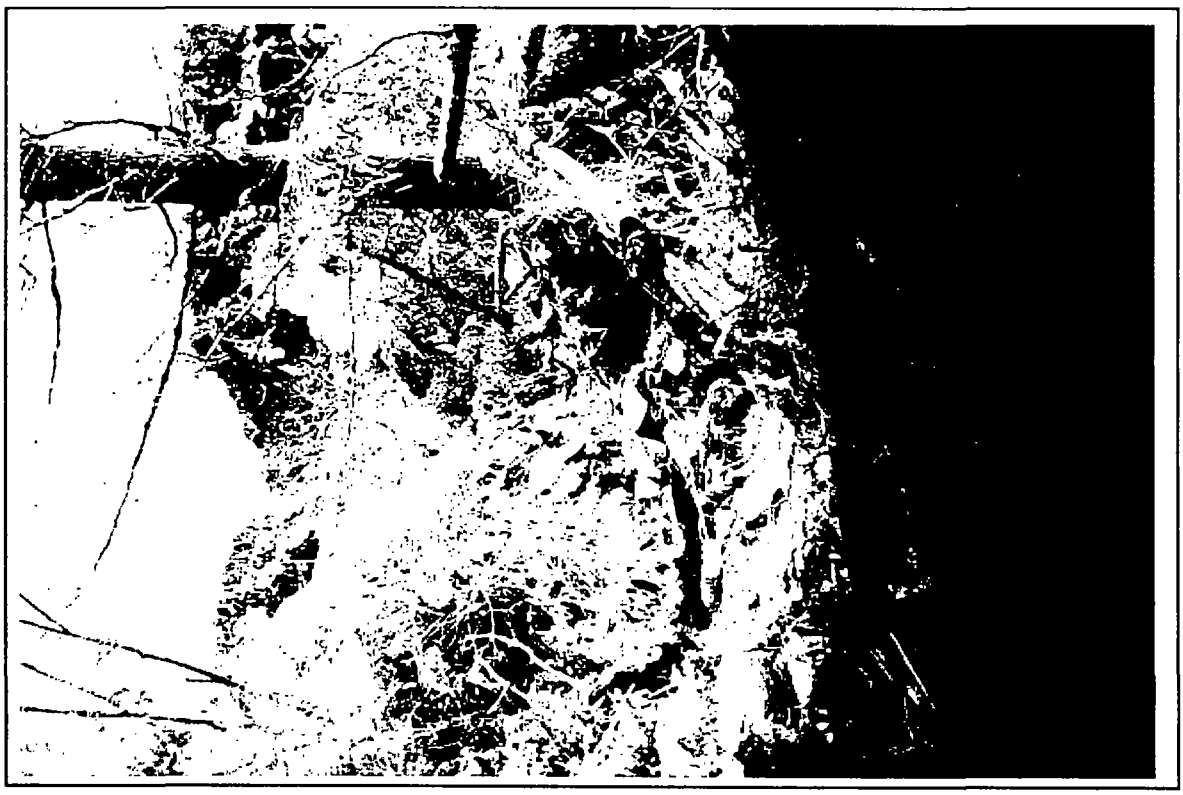
5. Blood bag located along bank of Gorst Creek.

8. Suspected washing machine near toe of slope. Note syringe near bottom center of photograph.

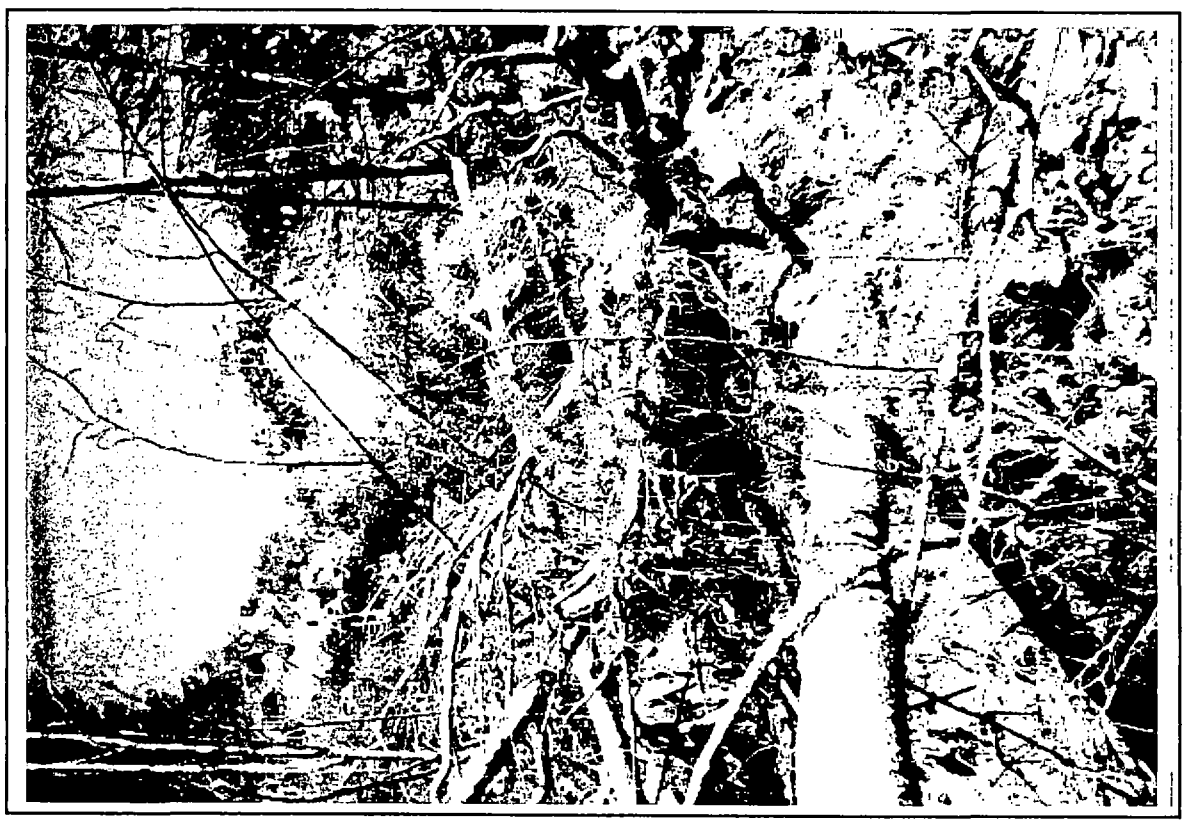
7. View looking downstream toward State Highway 3.

9. Location where Gorst Creek emerges from toe of landfill (bottom of photo).

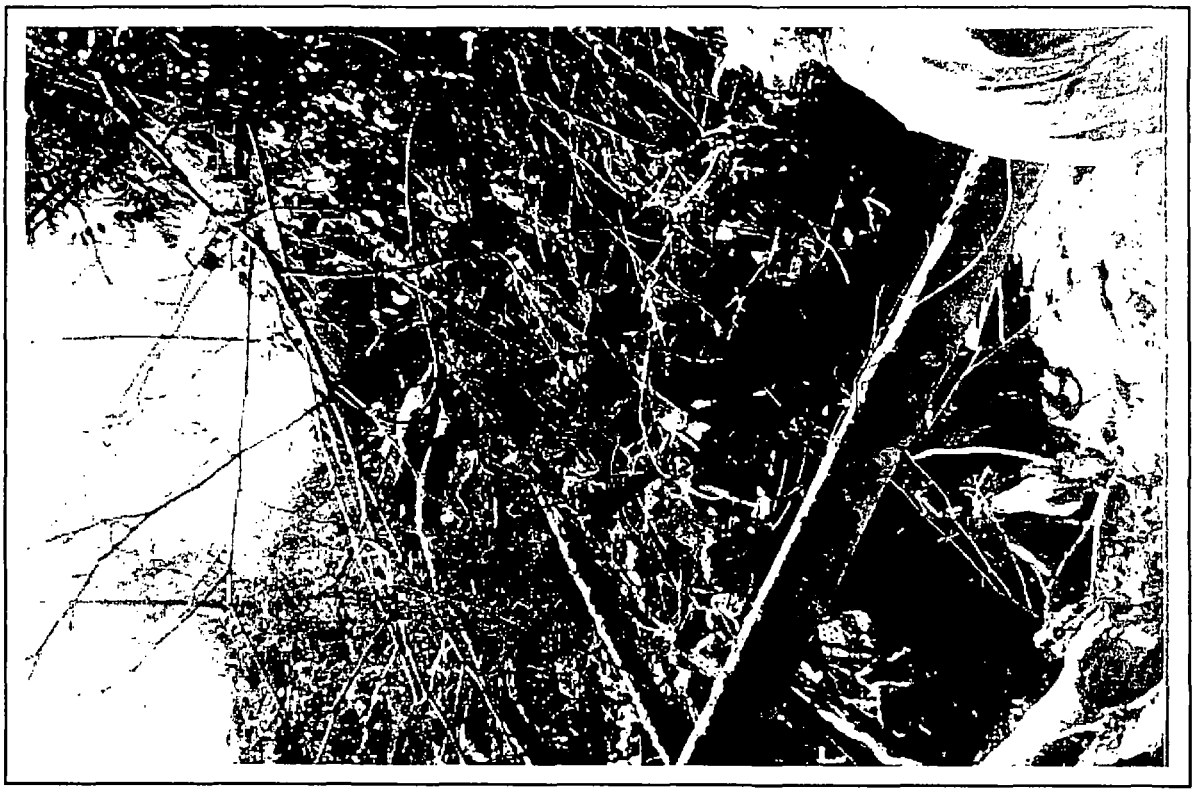
10. Overview of landfill slope.



12. View of landfill slope from left to right (North to South).



11. View of landfill slope from left to right (North to South).



14. View of landfill slope from left to right (North to South).

13. View of landfill slope from left to right (North to South).

15. View of landfill slope from left to right (North to South).

AMES LANDFILL SITE VISIT REPORT

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6. Near the toe of the slope.
7. View looking downstream towards State Highway 3.
8. Suspected washing machine near toe of slope. Note syringe near bottom center of photograph.
9. Location where Gorst Creek emerges from toe of landfill (bottom of photo).
10. Overview of the landfill slope.

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